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ABSTRACT

The Fry Readability Formula was used to determine the readability levels of 12 first and second grade basal texts. These texts were part of the Ginn 360, Ginn 720, and Macmillan Series "r" basal reader series. The results showed that 4 of the 12 books tested did not correspond closely to the publisher's readability levels. The Ginn 720 text for the second half of first grade had readability levels significantly higher than the publisher's data. For the beginning second grade texts, both the Ginn 360 and Ginn 720 texts had readability levels significantly higher than the publisher's data. The Macmillan Series "r" was the only basal series that showed an exact correspondence between the publisher's data and the Fry Readability Formula data. (A survey of research related to first and second grade basal texts' readability levels is included.) (RL)

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READABILITY LEVELS OF FIRST AND SECOND GRADE BASAL TEXTS

by

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One of the problems in public education is how to tell whether a piece of writing is readable to a particular group of readers. There are several solutions. One is to guess. An educator can make estimates of readability from experience and feedback from others. This may have been a factor in Botel's (1952-3) study which found that twenty-five percent of pupils were overplaced in reading and content area books. This resulted in disinterest, discouragement, discipline problems and poor understanding.

Another solution is to test for comprehension of the material that has been read. From the oral and silent reading, levels of independent, instructional and frustration levels can be found. The educator can use inventories such as McCracken or Silvaroli for estimation.

A third solution is to use readability formulas. Several basal series, within a grade level, can be ranked in order of difficulty from easiest to hardest by use of a readability formula.

While the problem of matching a reader to the correct material remains a constant concern, readability formulas have been available since 1923, after Lively and Pressey's first attempt. (Fry 1977).

Educators began to find an objective way of quantifying readability following the development of mental measurements in World

War I. Educators became influenced by the publication of Thorndike's lists of the most frequently used words. (1921).

The readability formula was further developed after Gray and Leary (1935) made a survey of three hundred librarians, asking what made a book readable. Rudolph Flesch (1943) popularized the concept of readability through his books and articles on plain-speak of the language we speak or write down when communicating with others outside of our own specialty. His Reading Ease Formula was time-consuming and difficult. Soon other researchers developed simpler formulae. Attempting to simplify his formula were the Far-Jenkins-Paterson Formula (1951), Lorge (1959), Gunning's FOG Index (1952), Fry's Readability Formula (1968) and McLaughlin's SMOG Grading (1969).

While there are numerous formulae for finding the readability, most include similar variables such as sentence length and some measure of word length. The results of current readability formulae show similar findings.

Of the numerous formula available, only the Cloze Formula (Taylor 1953) involves a reader. Studies by Bormuth (1962) and Coleman and Miller (1968) show that cloze scores correlate with reading comprehension and other measures of readability. This method of deleting words involves testing students and can be more time consuming than applying formulas to books.

Martin Kling and Clement Harmowitz found that while formulas may be very close in results, it is probably more efficient to use the Fry Readability Formula at the primary level.

Whatever the formula used to determine the readability of material, the educator must select the reading material which is correct for each child. Because children have individual learning capacities, the educator should be aware that different basal readers are not for every child. The readability standards of one publisher may vary to another.

Having a chart to compare readabilities for different series can be helpful to the teacher who uses a multi-text approach for grouping. It can also help to determine which series to purchase for underachievers and above level readers. In light of this, a study to determine the readabilities of various basal series is desirable. Rearch is constantly providing such information. Yet new series enter the marketplace and further research needs to be done.

Hypothesis

There is a significant difference in the readability levels of such first and second grade reading basal tests as the Ginn 360, Ginn 720 and Macmillan Series r programs.

Definitions

Basal reader - a coordinated series of textbooks, workbooks and manuals in increasing difficulty of vocabulary and skill development.

Readability level - the indication of the difficulty of reading material in terms of the grade level at which it might be expected to be read easily.

Readability formula - a method of estimating the reading level of difficulty of printed material by analyzing samples taken from the selection or book.

Reading - the ability to translate what is comprehended from the printed page into action.

Reading level - an indication of an individual's skill development at a given time generally expressed in years and months.

Procedure

Twelve basal readers were selected for finding the readability levels as compared to the suggested levels. These were texts used in grades one and two from the Ginn 360, Ginn 720 and Macmillan Series r basal readers.

A readability formula was applied to five 100-word samples for each book. The Edward Fry Extended Formula was used to determine the readability levels. After finding a total number of sentences and syllables for each, an average sentence length and average number of syllables was plotted on the graph, giving an approximate grade level.

Results

The following graph illustrates the approximate grade levels for twelve basal texts, used widely in the first and second grades. The publishers approximate levels are indicated in blue and the levels found by applying the Fry Extended Readability Formula are shown in red. For establishing levels, the readabilities were approximated as closely as possible to either the beginning or ending of each grade to agree with the designated text level, e. g. 3^1 or 3^2.

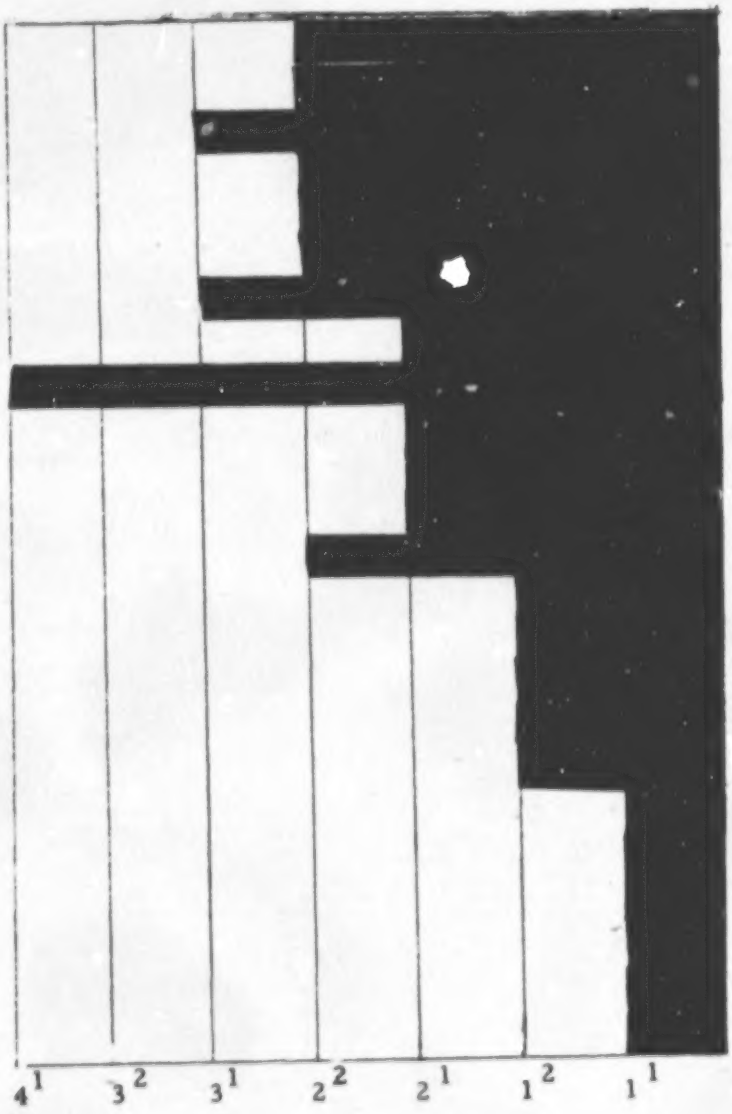
Each text in the Ginn 360 and 720 series had five 100-word samples. The Macmillan Series r was divided into two books for each text, therefore, a total of ten samples were established and an overall average was found.

At the beginning level for first grade, all text readabilities corresponded to those reported by the publishers.

The readabilities for the second half of first grade corresponded out to readabilities suggested for the Macmillan r and Ginn 360. The level for Ginn 720 was significantly higher than the given data.

For the beginning second grade texts, only the Macmillan Series r corresponded to the expected level. Both the Ginn 360 and Ginn 720 were significantly higher than the publisher's data.

Figure #I



How It Is Nowadays -720

How It Is Nowadays -360

Believe It-Feelings -Series r

A Dog Next Door -720

A Dog Next Door -360

Stand Tall-A Second Look -r

One To Grow On -720

Seven Is Magic -360

Colors-Being Me -r

May I Come In? -720

May I Come In? -360

Amigos -Ups and Downs -r

Conclusions

After comparing the publishers' stated readability level with that of the Fry Extended Formula, it is evident that not all texts correspond to the publisher's data for readability. This was most evident in the series published by Ginn and Company.

The results show that four of the twelve books tested did not closely correspond to the publisher's readability levels. The Macmillan Series r texts were the only series which showed an exact correspondence between the publisher's data and the formula used.

Further readability formulas could be used to increase the accuracy of the data or more samples could be averaged together. This might be desirable where significant discrepancies resulted. Since correspondence between publisher's data and independently derived data disagree, teachers and administrators should be aware that publishers reported trends may be at variant to a large degree from true readabilities and must plan to make adjustments in the instructional program to meet the levels of pupils if, in fact, avoidance of frustration is a criterion in effective instruction.

READABILITY LEVELS OF FIRST AND SECOND GRADE BASAL TEXTS: SURVEY OF RELATED RESEARCH

Readability has been a concern ever since the first symbols were used and recorded. A clear language quote was taken from I Corinthians 14:9 in the New Testament " Except ye utter by the tongue words easy to be understood, how shall it be known what is spoken? . For ye shall speak into the air".

Religious writers showed the earliest concern for readability, mostly because they were the only literate people of their day.

Educators took an interest in children's reading vocabulary in 1840 with the McGuffey Readers. By 1898 a reading difficulty and vocabulary foundation was set by F. W. Keading, a German, using counting. Vocabulary lists begar in 1889 by N. A. Rubakin, a Russian. E L. Thorndike's The Teachers Word Book (1921) helped show the frequency of words in reading. It was the basis of future studies for readability formulas.

Formulas for readability date back to 1921. H. D. Kitson used word length in syllables and sentence length in words as indicators of difficulty of newspapers and magazines. Bertha A. Lively and S. L. Pressey published a study indicating a readability formula in 1923. They included sixteen pieces of reading material of different levels of readability . They used Thorndike's ten thousand word list of frequent words as an indicator.

Carleton Washbourne and Mabel Vogel validated the formulas by Pressey and Levely by using their formula to analyze seven

hundred children's books. They used this formula to construct their own formula in 1928, which included prepositions and a regression equation.

Edward Dolch also did a study in 1928 analyzing textbook series ranging from primers to grade five, using percentages of difficulty.

A.S. Lewerenz developed an unusual formula in 1929 using words with different letters of the alphabet and comparing the number with his table of norms. His second technique in 1930 did not include adding words with different alphabet letters, but instead included vocabulary difficulty and vocabulary diversity. He later added the element of vocabulary interest (1935, 1938). Since he gave little information on the development, validation and application of any but his first technique, evaluation was difficult.

George R. Johnson developed a simple and reliable formula using polysyllabic words as indicators (1930). His formula used 100-word samples throughout a book. The polysyllabic words were counted and a percentage was determined.

W. Patty and W. Painter developed the next formula measuring vocabulary burden in 1931. Using Thorndike's word list, a weighted value was given to words found on third and fifth pages. An average was determined by a sample.

Thorndike's study (1934) was a typical study using his word

list and a norm list.

The early years of readability study paid attention to vocabulary as the basis for predicting readability. Vocabulary difficulty was measured by Thorndike's Teacher Word Book and the use of simple criteria for determining reading difficulty.

Ralph Ojemann studied adult reading difficulties in 1934. He tried to find factors connected to reading difficulties and factors of difficulty in materials. He arranged sixteen 500-word passages in order of difficulty according to test scores of subjects. He correlated sentence factors, vocabulary factors and qualitative factors (such as concreteness vs. abstractness of relations, obscurity and incoherence in expression).

Dale and Tyler did a similar study in 1934 to find factors which influence adult reading difficulty. Seventy-four selections on personal health were used as the criterion.

McClusky's study (1934) used speed as an index of readability rather than comprehension. He chose a selection from each book of fiction, political science, economics, sociology, psychology and physics. He had a true-false questionaire for each, then studied the number of ideas per one hundred words, number of letters per word, number of words per sentence, number of various types of nouns.

W.S. Gray and Bernice Leary also studied factors of difficulty in books for adults of limited reading ability. (1934). They made an

"Adult Reading Test" as the criterion for studying style factors which contribute to readability. The subjects had to answer a summary question and a detail question for each paragraph of the test. A regression equation was then used to predict readability.

Elizabeth Morriss's and Dorothy Halverson's "Idea Analysis Technique" was a study of words in context only. This differed from other studies of word analysis. Words were classified into one of these four categories: fundamental or elemental word labels, simple localisms, concrete word labels or abstract word lables.

The years 1934 to 1938 showed studies using more and different factors, less emphasis on Thorndike's word count and a greatern concern for an adequate criterion.

Carleton Washburne and Mabel Vogel Morphett revised their 1928 formula after ten years. The new formula had a more accurate criterion and covered grades one and two. An equation was applied after selecting a 1,000-word sample and counting different words, different uncommon words and a number of simple sentences in seventy-five sample sentences.

Irving Lorge's study was based on efficiency and simplicity. He reduced his formula to three factors but retained its efficiency. The McCall-Crabbs "Standard Test Lessons in Reading" was used as a criterion. The formula has remained the same except for the equation

which changed because of an original computation error.

G. A. Yaokam had an unpublished formula in 1939 that was later revised in 1948. It wasn't published until 1955 when it appeared in the Appendix of his Basal Reading Instructions. His formula included selecting ten pages of a book, rating words from Thorndike's words list and using a Reading Difficulty Scale for determining grade placement.

Edward Kessler (1941) developed a shortened formula from Gray and Leary using only two of their factors.

Another simple and best known formula was developed by Rudolph Flesch in 1943. It had only three factors, but remained accurate. Another reason, besides simplicity, for it becoming so popular was due to Flesch's growing popularity in fields other than education, such as government and business. He wrote articles and books on his views for readable writing. His study used magazine articles at five increasing levels of difficulty as a criterion. His three factor formula also used McCall-Crabbs Standard Test Lessons. A formula correction was made when he published his Reading Ease formula in 1948.

S.S. Stevens and Geraldine Stone tried Flesch's formula in 1947 on graduate and undergraduate psychology texts at Harvard University. They found one book to be overestimated an another to be underestimated. Flesch developed two new formulas possibly because of Steven's and Stone's findings. One new formula was for Reading Ease and one for Human

Interest. The Reading Ease Formula counted syllables and is simpler and quicker to use than his previous ones. It became the most frequently used formula in all fields.

The second most frequently used formula was developed by Edgar Dale and Jeanne Chall in 1948, to correct some factors of Flesch's original formula. They developed a shorter formula using only a word factor and a sentence factor. They used a larger word list and omitted Flesch's count of personal references. Studies by Klare (1950), and Powers, Summer and Kearl (1958) showed that the Dale-Chall formula is more predictive than others of that time.

Dolch studied readability of children's materials in 1948 to establish graded reading difficulty of textbooks. He examined the manner of presentation and found a steady increase in number of words per sentence from grade to grade.

Another formula for children's books was the University of Miami Method by Lester and Viola Wheeler (1948). They used Thorndike's word ratings to determine grade placement of words selected. An average difficulty, instructional level and independent reading level was found.

Flesch developed another formula which was designed to be a more "diagnostic and clinical tool" for readability (1950). His Level of Abstraction Formula was a more complex formula that again used the McCall-Crabbs Test Lessons and gave similar scores of his other

formulas. Gillie revised his formula and made it easier to use in 1957. Flesch's Reading Ease formula was also revised and reduced by James Farr, James Jenkins and Donald Paterson by counting one-syllable words instead of counting syllables of all words.

Robert Gunning used a syllable count in his formula in 1952 of words having three or more syllables and finding a Fog index or the reading grade level required for understanding the material.

McElroys Fog Count was similar to both Flesch and Gunning's Fox Index. He gave more insight to the value of syllable counting for readability (1953).

Between 1938 and 1953 readability formulas became more efficient. Tables were developed for quicker and easier computation of scores.

Fritz Forbes and William Cottle developed a formula for finding the readability level of public opinion poll questions and of advertising headlines and slogans in 1953.

George Spache developed a formula for primary grade reading materials in 1953. He sampled one hundred and fifty-two books used in grades one through three, counting words outside the Dale "Easy Word List". Clarence Stone revised Spache's formula by adding L. L. Krantz's "The Author's Word List" and his A Graded Vocabulary for Primary Reading (1957).

Lester Wheeler and Edwin Smith developed another primary grade readability formula which was similar to those of Spache and Gunning (1954).

Rudolph Flesch developed another complex formula in 1954. This "experimental" formula was found in a book for writers called How to Make Sense. The formula measured realism, specificity and and concreteness in the first part and energy, forceful delivery and vividness in the second part.

Edward B. Tribe's formula for elementary school materials was based on A Basic Vocabulary of Elementary School Children by Risland. Instead of using test data, he gave ten of the passages to each of four hundred and six children. The revised passages of the McCall-Crabbs Standard Lessons in Reading were used as the criteria.

The revised McCall-Crabbs Test Lessons (1950) were also used to revise the adult formulas by Flesch, Dale-Chall, Farr-Jenkins-Paterson, and Gunning. This was conducted in 1958 by R. B. Powers, W. A. Sumner and B. E. Kearl. In the findings the Dale-Chall formula was the best for predicting reading difficulty and Flesch's formula was the best one not using a word list.

Flesch developed another formula in the same year as the study by Powers, Sumner and Kearl. It was to measure "formality" to "popularity" in style of writing magazines, from formal academic

journals to everday popular ones and was intended for writers.

Richard Bloomer published a formula for measuring the level of abstraction as a function of the modifiers in a piece of writing (1959). He found in readers from primary to sixth grade that the modifiers increased in number and difficulty of discrimination as grade levels of the books increased. As written materials become more abstract they tend to become more specific.

The formulas developed between 1953 and 1959 were more specialized than before, with more specific purposes. All of the formulas involved a reader except the Cloze Technique by Taylor (1953). This method of deleting words involves testing students and can be more time consuming than applying formulas to books.

Studies done after 1959 seem to correct or revise what had already been studied. Recent formulas continue to use word familiarity, word length and sentence length which were identified as factors contributing to difficulty by Herbert Spencer in 1852.

Studies by Bormuth (1962) and Coleman and Miller (1968) showed that Cloze scores correlate with reading comprehension and other measures of readability. Bormuth continued studying Taylor's formula (1969, 1971) in order to validate it as a means of estimating readability of material. While time consuming, the results seem to show more reliability than scores found with standard formulas. Siegel (1974) found the Cloze method to be an accurate measure of readability. Lowry and

Marr revised Taylor's Cloze Formula (1974) by comparing the responses with those of a criterion group instead of the original material. This measuring of comprehension with another specific group is called Cloz-entropy. Rankin (1974) found six factors of caution when using the cloze method. One factor concerns the deletion of every fifth word when using scientific or specialized material. McNieh, Kazelship and Cox (1974) responded to this caution with research in trying to find the appropriate deletion space of all material. They found that varying the rate within different areas does affect performance. Harrison and Jacobson (1979) suggest using some form of cloze procedure for finding the readability of instructional materials because it is the only procedure which can account for a natural setting, the restrictions of the language of the reading material, ability and characteristics of the reader and background of information needed by the reader.

A standard formula using vocabulary and sentence length was developed in 1968 by Edward Fry. His claims of difference is that his formula takes much less time than other standard formulas. His Readability Graph ranks books on a hard to easy level as does the Dale-Chall and Flesch formulas and gives about the same grade level designations. Martin Kling and Clement Harmowitz compared the lower levels of graph with Spache's formula and found that even though formulas may be very close in results, the Fry Readability Formula was more efficient to use at the primary level. Much of the current work on readability for a

particular material, such as reading series, has utilized the Fry method. John Luiten (1978) used a corrected procedure by McCuaig and Hutchings to access readability variations using Fry's readability chart.

Studies have been done to find predictors other than sentence and vocabulary length. Botel, Dawkins and Granousky (1973) studied the role of syntactic complexities. Kidder and Golub (1974) established a syntactic density score. As standard formulas they also rank selections in order of difficulty.

Other studies (Carroll 1977, Lesgold 1973, Stodt 1972) have taken into account the role of grammatical units, word classes and paragraph structure which might affect the readability material.

By using computer programming, Jacobson (1974) and Harris and Jacobson (1976) were able to increase the prediction of pupil scores on comprehension of McCall-Crabbs passages by extending readability variables to include phoneme-grapheme correspondences. Jacobson (1978) used these phoneme-grapheme correspondence formulas in a study to find the most common phonics skills in the primary levels of six widely used reading series.

Selden (1977) provided preliminary measures for determining frequency of syntactic patters and their relationship to readability and then a computerized method for recording sentences as grammatical strings.

Frederikson's work (1978) studied the processing required by basal readers and compared the inferencing difficulties with those rated by a readability formula.

While Nelson (1978) and Standal (1978) warn of the overemphasis on readability, Harris and Jacobson (1979) feel as many others, that readability has been very much neglected for decades. Many studies have been published concerning revisions or use of past formulas, while many current needs of readability have been overlooked.

While research continues, the educator still has the job of selecting reading material which is appropriate for each child. The readability standards (as formulas) may vary from one publisher to another. Because children have individual learning capacities, the educator should be aware that different basal readers are not for every child.

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